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10/589,919	08/18/2006	Shinji Yamamoto	2946-204	1069

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EXAMINER	
CRAIG, DWIN M	

ART UNIT	PAPER NUMBER
2123	

NOTIFICATION DATE	DELIVERY MODE
07/15/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

Office Action Summary	Application No.	Applicant(s)	
	10/589,919	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	DWIN M. CRAIG	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-12 have been presented for reconsideration based on Applicants' amended claim language, arguments and submission of a terminal disclaimer.

Response to Arguments

2. Applicants' arguments presented in the May 20th 2010 responses have been fully considered; the Examiner's response is as follows:

2.1 As regards Applicants' response to the Non-Statutory Obviousness-Type Double Patenting rejections, the Examiner thanks the Applicants' for presenting a corrected terminal disclaimer and hereby withdraws the previously applied Non-Statutory Obviousness-Type Double Patenting rejection of the claims.

2.2 As regards Applicants' response to the 35 U.S.C. 103(a) rejections of claims 1, 2, 4, 5, 6, 8, 9, 10 and 12, Applicants' argued;

On page 7 of the May 20th 2010 response Applicants' stated that, "Claims 1,2, 5, and 9 are hereby amended. Support for the amendments to claims 1, 5, and 9, which merely clarify the natural size of the garment parts that is obtained by the invention as recited in the original claims and *do not narrow the original claim scope*, may be found, inter alia, at paragraphs [0007]-[0009], [0013], [0015], [0038], [0041], [0042], [0046], and [0049] of Applicants' specification, as well as in FIGS. 9-12 and 18.", *emphasis added.*

Applicants' have opined that the scope of the claimed subject matter has not been changed. The Examiner respectfully traverses this position for the reasons set forth below.

Then on page 9 Applicants' argued;

"Independent claims 1, 5, and 9, are patentable over the combination of Ziakovic and Kotaki at least because neither of these references discloses or suggests all of the features recited in claims 1, 5, and 9. For example, neither Ziakovic nor Kotaki discloses or suggests the claimed features related to shrinking/expanding the knit garment toward matched axes so that a portion the garment contacts the human model or a number of stitches per length reaches a predetermined value.",

The Examiner notes that the limitations of *shrinking and expanding the knit garment toward matched axes so that a portion of the garment contacts the human model or a number of stitches per length reaches a predetermined value*, contains the newly amended limitations (se underlining) that the simulated garment shrinks or expands until either the contact with the human model is made *or* the stitches are a predetermined length. Therefore the scope of claims 1, 5 and 9 have changed, the previously presented claims did not contain the express limitations that the shrinking or expanding knit garment either contacts to the human model or expands or shrinks until the stitches per length reach a predetermined value. Neither *Ziakovic* nor *Kotaki* expressly disclose the newly presented claim limitations, therefore the previously applied prior art rejections of claims 1, 5 and 9 have been withdrawn.

2.3 As regards the Applicants' response to the 35 U.S.C. § 112 second paragraph rejections of claims 3 and 7, the Examiner has found Applicants' arguments as set forth on page(s) 13 of the May 20th 2010 responses to have been persuasive. The term *distortions* is clearly defined in paragraphs [0030] & [0051]-[0052] to be the changes in appearance of the simulated garment

when said garment is shrinking/expanding on the human model. The previously applied 35 U.S.C. § 112 second paragraph rejections of claims 3 and 7 have been withdrawn.

2.4 As regards Applicants' arguments as set forth regarding the use of Official Notice by the Examiner in rejecting claims 3 and 7 on pages 10-12 of the 20 May 2010 responses, Applicants' argued;

"Warsop appears to be directed to the construction of a physical fabric, and does not address any concerns of simulating a knit garment, such as rearranging stitches (in course and wale directions, or any other directions) to remove distortions. While Ziakovic may cursorily mention a "mechanical simulation" step, Ziakovic fails to disclose or describe any details of this step. For example, Ziakovic does not discuss, mention, or even suggest rearranging the stitches of the garment in a course direction and a wale direction. One having ordinary skill in the art, in view of the limited disclosures of Ziakovic and Kotaki, and even in view of Warsop (i.e., having mere knowledge of courses and wales), would not have found it obvious to rearrange each stitch along a course direction and a wale direction as described in Applicants' specification and as recited in claims 3 and 7."

The Examiner respectfully traverses Applicants' argument, an artisan of ordinary skill, as agreed upon by the Applicants' would have knowledge of the fact that fabric would be folded in the course and wale directions when placed on a simulated body. For the reasons set forth in the previous Office Action, an artisan of ordinary skill would want to have a realistic simulation and therefore have the fabric be aligned in a course and wale direction to remove distortions would be a reasonable physical phenomena to simulate in order for the simulation to produce realistic

result that provide high fidelity to actual garments being placed on real bodies. For this reason it would have been within the knowledge of an artisan of ordinary skill to have modeled and simulated a garment in this manner.

2.5 An updated search, based on the newly presented limitations, has revealed new art.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 4, 5, 6, 8, 9, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,968,297 to Ziakovic et al. in view of "Large Steps in Cloth Simulation" hereafter referred to as Baraff et al.

3.1 As regards independent claims 1, 5 and 9 and using claim 1 as an example, *Ziakovic* teaches, *a method for simulating wearing of a knit garment on a human model, the knit garment being a virtual knit garment and having a plurality of parts,* (see Figures 1-9A and as regards a teaching of a *virtual dummy* see Col. 2 lines 38-43, more specifically "…The invention provides a method of viewing a garment made up of garment pieces on a virtual dummy…" a virtual dummy is the same as a *human model*) *the human model being a three-dimensional human model and comprising a plurality of polygons* (see Figure 16 and Col. 6 lines 44-48 more specifically, "the surface resulting from the accumulation of convex polygons…"), *the method comprising the steps of: providing the human model with a plurality of axes* (Figure 8 and the descriptive text)*; matching each of the parts of the knit garment with any of the plurality of axes* (see Col. 4 lines 1-3, placing is functionally the same as matching, see also Col. 7 lines 6-12 not the discussion regarding *point-to-point relationship between the surface of the dummy and the piece* of fabric) *and temporarily positioning the knit garment with respect to the human model; and shrinking/expanding the temporarily positioned knit garment toward the axis matched with each of the parts of the knit garment in a peripheral direction to obtain a natural size of each of the parts, whereby the knit garment is worn on the human model so that each of the parts*

appears outside the human model (see the discussion of deformation and fitting of the knit garment to the model in Col. 9-14).

However, *Ziakovic* does not expressly disclose, *shrinking and expanding the knit garment toward matched axes so that a portion of the garment contacts the human model.*

Baraff teaches, *shrinking and expanding the knit garment toward matched axes so that a portion of the garment contacts the human model*, see Figure 3 through Figure 7 as well as the discussion regards detecting collisions presented on pages 4 & 5 regarding stretch forces;

4.2 Stretch Forces

Recall that every cloth particle has a changing position $\mathbf{x}_i$ in world space, and a fixed plane coordinate (u_i, v_i). Even though our cloth is modeled as a discrete set of points, grouped into triangles, it will be convenient to pretend momentarily that we have a single continuous function $\mathbf{w}(u, v)$ that maps from plane coordinates to world space. Stretch can be measured at any point in the cloth surface by examining the derivatives $\mathbf{w}_u = \partial\mathbf{w}/\partial u$ and $\mathbf{w}_v = \partial\mathbf{w}/\partial v$ at that point. The magnitude of $\mathbf{w}_u$ describes the stretch or compression in the u direction; the material is unstretched wherever $\|\mathbf{w}_u\| = 1$. Stretch in the v direction is measured by $\|\mathbf{w}_v\|$. (Some previous continuum formulations have modeled stretch energy along an axis as essentially $(\mathbf{w}_u^T\mathbf{w}_u - 1)^2$, which is a quartic function of position [15, 16, 17, 4]. We find this to be needlessly stiff; worse, near the rest state, the force gradient—a quadratic function of position—is quite small, which partially negates the advantage implicit integration has in exploiting knowledge of the force gradient. A quadratic model for energy is, numerically, a better choice.)

And also see the discussion regards other forces on page 5;

4.4 Additional Forces

To the above forces we also add easily implemented forces such as gravity and air-drag (which is formulated on a per-triangle basis, and opposes velocities along the triangle's normal direction). When the simulation is fast enough to interact with, we add user-controlled "mouse" forces. These forces and their gradients are easily derived.

See also the discussion regarding constraints on page 6.

5 Constraints

In this section, we describe how constraints are imposed on individual cloth particles. The constraints we discuss in this section are either automatically determined by the user (such as geometric attachment constraints on a particle) or are contact constraints (generated by the system) between a solid object and a particle. The techniques we describe in this section could be used for multi-particle constraints; however, constraints that share particle would need to be merged. Thus, a set of four-particle constraints (such as vertex/triangle or edge/edge contacts in the cloth) might merge to form a single constraint on arbitrarily many particles, which would be expensive to maintain. Because of this, we handle cloth/cloth contacts with strong springs (easily dealt with, given the simulator's underlying implicit integration base) and "position alteration," a technique described in section 6.

At any given step of the simulation, a cloth particle is either completely unconstrained (though subject to forces), or the particle may be constrained in either one, two or three dimensions. Given the differential nature of our formulation, it is the particle's acceleration, or equivalently, the change in the particle's velocity, that is constrained. If the particle is constrained in all three dimensions, then we are explicitly setting the particle's velocity (at the next step). If the constraint is in two or one dimensions, we are constraining the particle's velocity along either two or one mutually orthogonal axes. Before describing our constraint method, we discuss several other possible enforcement mechanisms and explain why we chose not to use them.

Ziakovic and *Baraff* are analogous art because they both come from the same problem solving area of simulating Knit Garments.

At the time of the invention, it would have been obvious, to an a person of ordinary skill in the art to have used the teachings of *tubular knit garments with a portion of the garment having contact with a human model* with the teachings of modeling a knit garment.

The motivation for doing so would have been, to have a faster simulation which uses a lower amount of processing resources, see page 1 of *Baraff et al.*

Therefore, it would have been obvious to combine the teachings of *Baraff et al.* with the teachings of *Ziakovic* in order to obtain the invention as specified in claims 1, 2, 4, 5, 6, 8, 9, 10 and 12.

3.2 As regards claims 2, 6 and 10 and using claim 2 as an example, *Ziakovic* discloses *wherein: the human model comprises at least a torso and both arms, along with an axis of the torso, and axes of the right and left arms; the plurality of parts of the virtual knit garment comprises at least a body and sleeves, each of the parts is matched with any of the axes of the human model, and the temporal positioning is performed so that the axis matched with each of the parts passes through the inside of each of the parts; and both of the sleeves of the virtual garment are shrunk/expanded such that upper parts of the both sleeves contact with upper parts of the arms of the human model and spaces are provided at lower parts of the both sleeves with respect to the upper parts of the arms of the human model.* (see the discussion of deformation and fitting of the knit garment to the model in Col. 9-14 and Figures 3-18 and the descriptive text).

3.3 As regards claims 4, 8 and 12 and using claim 4 as an example, , *Ziakovic* discloses *wherein after wearing the knit garment, each of stitches of the knit garment is moved close to a mean position of surrounding stitches, whereby positions of the stitches of the knit garment are smoothed, and the smoothing is repeatedly performed.* (see the discussion of deformation and fitting of the knit garment to the model in Col. 9-14 and Figures 3-18 and the descriptive text).

4. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) unpatentable over U.S. Patent 6,968,297 to Ziakovic et al. in view of *Barraf et al.*

4.1 As regards claims 1 and 2, from which claim 3 depends and claims 5 and 6 from which claim 7 depends, see above.

4.2 OFFICIAL NOTICE

As regards claims 3 and 7, having a stitch on a virtual or actual garment be arranged or re-arranged along the *course or whale* direction is well known in the garment art.

For example U.S. Patent 4,306,429 teaches stitch wales in bonded fabrics.

Claim interpretation, the disclosed teachings of Ziakovic teaches that a deformation function is optimized, see Figure 14 item S342 and Col. 14 lines 55-60 more specifically, "The garment can then be relaxed (step S34). Then comes the mechanical simulation step (S38) which makes it possible, for a given fabric, to find the correct drape for it, and which makes it possible to remove any remaining *deformations*. Is being interpreted to mean the same as the claimed *distortions* as expressly claimed in Applicants' instant claims.

At the time of the invention, it would have been obvious, to an artisan of ordinary skill in the art to have had a model of a tubular element in a virtual knit garment to be rearranged along the course or wale direction.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DWIN M. CRAIG whose telephone number is (571)272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul L. Rodriguez can be reached on (571) 272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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